UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

FEB 17 2006

MEMORANDUM FOR: Scientific Research Permit No. 1180, 151422SWR2003SA8829

FROM: Rodney R. McInnis
Regional Administrator

SUBJECT: Addendum to the Central Valley and Northern and Central Coast Programmatic Biological Opinions and Conference Opinion for North American green sturgeon for Scientific Research

I. CONSULTATION HISTORY

Section 10(a)(1)(A) of the Endangered Species Act of 1973 (ESA), as amended, provides NOAA's National Marine Fisheries Service (NMFS) with authority to grant exceptions to the ESA's "taking" prohibitions for scientific research (see regulations at 50 CFR 222.301 through 222.308 and 50 CFR 224.101 through 224.102). Section 10(a)(1)(A) scientific research or enhancement permits may be issued to Federal or non-Federal entities conducting research or enhancement activities that involve an intentional take of ESA-listed species. Any permitted research or enhancement activities must: (1) be applied for in good faith, (2) if granted and exercised, not operate to the disadvantage of the endangered species, and (3) be consistent with the purposes and policy set forth in section 2 of the ESA (50 CFR 222.303(f)). NMFS prepared this addendum in compliance with section 7(a)(2) of the ESA, as amended (16 U.S.C. 1536). NMFS addressed the effects of the proposed research on listed salmonids by preparing this addendum to the Central Valley programmatic biological opinion for scientific research (Central Valley research opinion; NMFS 2003a) and Northern and Central Coast biological opinion for scientific research (Northern and Central Coast research opinion; NMFS 2002), signed on September 5, 2003, and October 22, 2002, respectively, in compliance with section 7(a)(2) of the ESA (16 U.S.C. 1536). This document also includes NMFS' conference opinion on the effects of the proposed research on proposed threatened North American green sturgeon (*Acipenser medirostris*). In the event that North American green sturgeon are listed as threatened, NMFS will review the project description and confirm the conference opinion as a biological opinion if there are no significant changes to the action.

On February 11, 1999, NMFS issued section 10(a)(1)(A) Scientific Research Permit No. 1180 (Permit 1180) to Thomas R. Payne & Associates (TRPA) to authorize various research activities focused on ESA-listed salmonids (62 FR 44645). On August 23, 2002, TRPA submitted to NMFS a request to modify Permit 1180 to authorize a research project intended to describe the distribution and abundance of salmonids within five watersheds in central California. Since the proposed research includes significant changes in locations relevant to previously analyzed activities and included a request for take of an additional species, Central Valley spring-run

Chinook salmon *(Oncorhynchus tshawytscha)*, NMFS determined that the TRPA request constituted a major modification request, which is processed in the same manner as a new permit. Therefore, NMFS published a notice of receipt for this modification request in the Federal Register on September 9, 2002 (67 FR 57221), commencing a 30-day public comment period. No comments were received.

On June 28, 2005, the applicant, TRPA, asked NMFS to remove the Olsen Power Plant Project Trout Monitoring Studies from the project description. Although this project is listed in the August 23, 2002, materials, it will not be discussed in this biological opinion.

II. DESCRIPTION OF THE PROPOSED ACTION

Under the authority of section 10(a)(1)(A) of the ESA, NMFS proposes to issue research Permit 1180 to TRPA authorizing take of adult and juvenile listed Sacramento River winter-run Chinook salmon *(O. tshawytscha)*, Central Valley spring-run Chinook salmon, Central Valley steelhead *(O. mykiss)*, Central California Coast steelhead *(O. mykiss)*, and proposed North American green sturgeon. The permit would be in effect through 2010 and would be subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit unless it is modified, suspended, or revoked sooner.

A. Project Activities

In the request to modify Permit 1180, TRPA proposes to conduct a variety of research activities throughout the Central Valley and the Sacramento-San Joaquin Delta that may affect winter-run Chinook salmon, spring-run Chinook salmon, steelhead, or green sturgeon. The research projects are summarized below.

1. Lower Putah Creek Fish Monitoring and Splittail Studies, Solano County Streams Fish Monitoring Study, Ulatis Flood Control Project Channel Fish Monitoring Study

For these three monitoring projects, electrofishing (either backpack or barge mounted) will be used. In general, a single pass will be made through about 200 to 500 feet of stream habitat at each site, with effort expended both in midchannel and along margins. No block nets will be used during sampling. All fish captured will be immediately netted and placed in buckets aerated with small battery-powered bait-bucket aerators. As buckets become full, fish will be transferred to a net pen located in the creek and away from the shocking area.

After shocking, fish will be identified, counted, measured, and all salmonids will be weighed on an electronic balance. A 3:1 solution of club soda (CO_2) will be used to anaesthetize all salmonids, which will then be transferred to an aerated bucket and allowed to fully recover from the measuring procedure before being released back to the site of capture. Attempts will be made to collect all length and weight data from any captured salmonids before working up other non-sensitive resident fish species. It is anticipated that salmonids might be held in buckets of aerated water maintained at the ambient creek temperature for a maximum of 60 minutes.

No tissue or scales are proposed to be collected during the surveys. Tissues, otoliths, or scales from salmonids that suffer any incidental mortality may be collected for predetermined qualified research projects. Site specific details are discussed in the following three sections.

a. *Lower Putah Creek Fish Monitoring and Splittail Studies*

The purpose of these studies is to continue to monitor the distribution and relative abundance of the fish populations in lower Putah Creek. The sampling will occur along the lower 28.2 miles of Putah Creek between Putah Diversion Dam and the Yolo Bypass Toe Drain. The fall monitoring program will be conducted under the auspices of the lower Putah Creek Coordinating Committee (LPCCC), which was created by the Amended Judgment in the case of Putah Creek Council v. Solano Irrigation District and Solano County Water Agency, Sacramento County Superior Court No. 515766. The annual fish sampling surveys will be coordinated through the LPCCC and the Solano County Water Agency.

The lower Putah Creek fish monitoring project has been conducted twice annually during late June and mid-October since 1991. Beginning in 2001, the LPCCC recommended that the monitoring program be limited to a single fall survey. Sampling for the splittail studies will be conducted at three sites once each week for approximately 13 weeks from March through May.

For the lower Putah Creek fish monitoring project, electrofishing using a gas-powered pulsator floated in a small tote barge will be used to capture fish from 10 or 11 sites in the lower 24 miles of the Putah Creek basin. An electrofishing boat also will be used at one or two of the sites.

The splittail surveys will be limited to three sites located in the lower 4 miles of Putah Creek, in the Yolo Bypass area. Once per week during the sampling period, larval fish will be captured using light traps set at night for a minimum of 1 hour. Juvenile and adult fish will be captured during the day using a seine deployed on foot or by boat. Larval samples will be fixed in formalin and sent to a qualified laboratory for identification. Juvenile and adult fish will be transferred to aerated buckets where they will be identified and counted. All salmonids captured will be held in a separate aerated bucket and their lengths visually estimated. They will then be quickly released without being anesthetized or handled. No tissue or scales are proposed to be collected during either of the surveys

b. *Solano County Streams Fish Monitoring Study*

The purpose of this study is to monitor the distribution and relative abundance of the fish populations of Suisun Creek, Green Valley Creek, and Ledgewood Creek in Solano County and Napa County, California. All three streams originate in the Vaca Mountains, east of the City of Napa and west of the City of Vacaville, and empty into the Grizzly Bay/Suisun Bay area of the San Francisco Bay/Delta via Suisun Marsh. Sampling will occur at several sites in each of the stream basins between Interstate Highway 80 and the headwaters. Although originally conducted twice annually in July and October, it is anticipated that future sampling will be limited to one annual survey sometime between July and October. This monitoring program is part of a larger Habitat Conservation Plan (HCP) that is being prepared by the Solano County

Water Agency as a requirement of the USFWS in their March 1999 Biological Opinion for the Solano Project Water Service Contract Renewal.

Fish populations will be monitored using a battery-powered backpack electrofisher to capture fish from a total of 11 to 18 sites in the 3 basins (5-8 sites in Suisun Creek, 3-5 sites in Green Valley Creek, and 3-5 sites in Ledgewood Creek).

c. *Ulatis Flood Control Project Channel Fish Monitoring Study*

The purpose of this study is to monitor the distribution and relative abundance of the fish populations of the Ulatis Flood Control project channels. The Ulatis Flood Control project is located in Solano County in the lowland agricultural and grazing lands east of Vacaville and south of Dixon. The project area includes the lower portions of the Ulatis Creek channel and its tributaries (Alamo, Sweeney, McCune, Horse, and Gibson Canyon creeks) that ultimately drain into Cache Slough. Since the project was designed for flood control, the stream channels in this area have very little natural character, but rather consist of a series of dikes and levees devoid of riparian vegetation. The sampling will occur along approximately 13 separate sites within the various channels of the flood control project and will typically be conducted in late fall prior to any seasonal rainfall. This monitoring program will be conducted in support of environmental studies to be used in California Environmental Quality Act (CEQA) documentation required for renewal of the maintenance Memorandum of Understanding (MOU) between Solano County Water Agency and the California Department of Fish and Game. The existing MOU expired in 2002 and the new MOU will run through 2007.

The fish monitoring studies in the Ulatis Flood Control Project channels will continue to be limited to one single annual survey conducted sometime between July and October. The monitoring has been conducted since 2000 and to date has included a total of two surveys in 2001 and 2002. The goal of the sampling program is to collect biological data (lengths and counts) on fish populations throughout the flood control project area in order to monitor their distribution, abundance, diversity, their overall condition and health, and to describe the existing conditions within the project area. All activities have the potential to affect populations of the listed Central Valley steelhead distinct population segment (DPS) that could possibly exist outside of the flood control project area in the upper basins of some of the creeks.

Fish populations will be monitored using a battery-powered backpack electrofisher to capture fish from approximately 13 sites distributed throughout the Ulatis Flood Control Project area.

2. Oroville Facilities Relicensing Instream Flow Studies

The existing license for the Oroville Facilities (FERC No. 2100) expires on January 31, 2007. The California Department of Water Resources operates the facilities and is responsible for the relicensing efforts. Constructed at the foot of the Sierra Nevada Mountains in Northern California, the Oroville Facilities are located on the Feather River in Butte County. They also include boundaries that extend from south of the City of Oroville to reaches of the South Fork, Middle Fork, North Fork and the West Branch of the North Fork of the Feather River. The

Oroville Facilities include the Oroville Dam and Reservoir (Lake Oroville), the Edward Hyatt Powerplant, Thermalito Powerplant, Thermalito Diversion Dam Powerplant, Thermalito Forebay and Afterbay, and associated recreational and fish and wildlife preservation and enhancement facilities. The Oroville Reservoir is the principal water storage facility of the State Water Project (SWP) which conserves and delivers water to over two-thirds of California's population. Water releases made from the Oroville Facilities affect stream flows and fish habitat in the lower Feather River and lower Sacramento River.

The objective of this instream flow study is to review and evaluate the adequacy of the existing data from previous instream flow studies for the lower Feather River using the Physical Habitat Simulation Model (PHABSIM; Bovee 1982). If the data are inadequate or incomplete, additional field surveys will be conducted to supplement the existing data in order to complete a satisfactory description of relationship between stream flow and salmonid spawning and rearing habitat in the lower Feather River. The habitat indices will be evaluated using both existing (post-Oroville Dam) and historical (pre-dam) hydrology. The proposed instream flow study will be used in combination with other proposed environmental studies being conducted under the relicensing process to determine the project effects on salmonid resources. The study may suggest operational changes to the project that could improve or enhance salmonid stocks in the lower Feather River including listed stocks of Central Valley spring-run Chinook salmon and steelhead.

PHABSIM typically requires mapping of the stream channel and flow measurements across transects (1D model) or depth measurements at multiple points in a matrix (2D model) at various stream flows at various times of the year, including times of salmonid spawning, incubation, and rearing. Beside this data collection for the hydraulic model, biological data on the habitat use characteristics by a variety of fish species may be collected; primarily measurements of depth, velocity, substrate, and cover. This habitat suitability criteria data collection may include information on the fry, juvenile, adult, and possibly incubating stages of spring-run Chinook salmon and steelhead in the lower Feather River. The hydraulic and habitat suitability criteria will be combined in the PHABSIM model to generate an index of potential habitat conditions at various stream flows and water years. These habitat indices are an important component for decision-makers to help determine the timing and magnitude of project related flows to enhance populations of listed salmonids.

The instream flow study is being conducted in direct response to environmental studies required for project relicensing by the FERC. It will not only provide the environmental documentation required by FERC, but may also provide information useful for enhancing and protecting populations of spring-run Chinook salmon and steelhead in the lower Feather River, and possibly other Central Valley basins as well. The study, while being conducted under the larger umbrella of other fisheries studies, represent a unique set of data requirements that will probably not allow for much coordination other fish studies.

The instream flow study is anticipated to begin in the spring and continue for 5 years after the permit is issued, and will entail two separate tasks. The first task will be to collect hydraulic data at various locations along the lower Feather River. This data typically is collected at a minimum

of three flow levels, and includes information on depth, velocity, substrate, and cover along predetermined transects or sections. The second task will be to collect habitat suitability criteria, and involves snorkeling or diving along the river, observing undisturbed fish of interest and marking their locations with small weights. At each fish location, data is collected on the species, size, behavior, distance from water surface, substrate, cover, overall water depth, and mean column water velocity. While fish may be disturbed during both tasks, no fish will be captured or handled as part of the study.

All fish lengths will be estimated using direct observation techniques. If habitat suitability criteria is collected from salmon or steelhead redds, length and width of the redd as well as water depth and velocity may be collected at several points within and around the redds.

B. Description of the Action Area

The action area includes the lower reaches of five rivers within the Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon evolutionarily significant units (ESUs), Central Valley steelhead and Central California Coast steelhead DPSs, or within the range of the southern DPS of North American green sturgeon. Table 1 lists the streams that are proposed to be sampled, and provides the approximate location of each sampling reach within those streams.

Table 1. Locations of the five proposed river sampling reaches within the distribution of ESA-listed salmonid ESUs or southern DPS of North American green sturgeon in the Central Valley of California.

Body of Water	County	Location of sampling effort
Lower Putah Creek	Solano County	11 sites along the lower 28.2 miles of Putah Creek between the Putah Diversion Dam and the Yolo Bypass Toe Drain
Suisun Creek, Green Valley Creek, Ledgewood Creek	Solano County	a total of 11 to 18 sites between Interstate Highway 80 and the headwaters
Lower Ulatis Creek and its tributaries (Alamo, Sweeney, McCune, Horse, and Gibson Canyon Creeks	Solano County	13 separate sites within the various channels of the flood control project
South Fork, Middle Fork, North Fork, and the West Branch of the North Fork of the Feather River	Butte County	23.25 miles of the lower Feather River from the Fish Barrier Dam downstream to the confluence with Honcut Creek

C. Requested Amount of Take

1. Lower Putah Creek Fish Monitoring and Splittail Studies

In the 11 native fish surveys conducted throughout the period 1991 through 2004, a total of 9 incidental mortalities among the 345 salmonids (including 7 rainbow trout (*O. mykiss*), 1 brown trout (*Salmo trutta*), and 1 Chinook salmon (*O. tshawytscha*)) captured and handled (2.6 percent mortality rate) have been documented (Salamunovich 2002). No green sturgeon or white sturgeon (*Acipenser transmontanus*) were observed or captured (Tim Salamunovich, Fisheries Biologist, Thomas R. Payne & Associates, pers. comm., October 25, 2005).

Table 2. Anticipated Annual Juvenile Take and Mortality Estimates*

Number of Individuals Affected	Number of Unintentional Mortalities	Species and/or ESU	Date
80	2	Sacramento River winter-run Chinook salmon	March-May
80	2	Central Valley spring-run Chinook salmon	March-May
400	8	Central Valley Steelhead	March-May
2	0	North American Green Sturgeon	March-May
200	10	Central Valley Steelhead	October

*Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and North American Green sturgeon are not expected to occur in lower Putah Creek upstream of the Yolo Bypass, and hence are not likely to be adversely affected by the proposed activities in that location. Central California Coast steelhead do not occur in the Putah Creek drainage or in the Yolo Bypass.

2. Solano County Streams Fish Monitoring Study

In the 5 surveys conducted during the period 1999-2002 a total of 9 incidental mortalities among the 169 rainbow trout/steelhead captured and handled have been documented (5.3 percent mortality rate).

Table 3. Anticipated Annual Take and Mortality Estimates for Central California Coast Steelhead*

Number of Individuals Affected	Number of Unintentional Mortalities	Life Stage	Location	Date
250	13	Juvenile	Suisun Creek	July-October
5	1	Adult	Suisun Creek	July-October
250	13	Juvenile	Green Valley Creek (including Wild Horse Creek)	July-October
5	1	Adult	Green Valley Creek (including Wild Horse Creek)	July-October
50	3	Juvenile	Ledgewood Creek	July-October
5	1	Adult	Ledgewood Creek	July-October

*Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and North American Green sturgeon are not expected to occur in Suisun, Green Valley, or Ledgewood Creeks upstream of I-80, and hence are not likely to be adversely affected by the proposed activities.

3. Ulatis Flood Control Project Channel Fish Monitoring Study

No salmonids or sturgeon have been captured in any of the previous surveys. The following are the applicants best estimates of potential take for the proposed sampling.

Table 4. Anticipated Annual Take and Mortality Estimates of Central Valley Steelhead*

Number of Individuals	Number of Unintentional Mortalities	Life Stage	Date
25	2	Juvenile	July-October
5	1	Adult	July-October

*Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and North American Green sturgeon are not expected to occur in the Ulatis Creek drainage upstream of Cache Slough, and hence are not likely to be adversely affected by the proposed activities. Central California Coast steelhead do not occur in the Ulatis Creek drainage.

4. Oroville Facilities Relicensing Instream Flow Studies

Direct observation may temporarily disturb individual fish but poses no risk of injury or death to fish. Collecting information from salmonid redds may pose some risk to incubating eggs if there is some mechanical disturbance of the redds, such as excessive walking on or through the active nest.

Table 5. Anticipated Annual Take and Mortality Estimates for Year Around Sampling in the Feather River below Oroville Dam*

Number of Individuals	Number of Mortalities	Species and/or ESU	Life Stage
600	0	Central Valley spring-run Chinook salmon	Fry
600	0	Central Valley spring-run Chinook salmon	Juvenile
200	0	Central Valley spring-run Chinook salmon	Adult
200	0	Central Valley spring-run Chinook salmon	Incubating Redds
600	0	Central Valley Steelhead	Fry
600	0	Central Valley Steelhead	Juvenile
200	0	Central Valley Steelhead	Adult
200	0	Central Valley Steelhead	Incubating Redds

*Sacramento River winter-run Chinook salmon are not expected to occur in the Feather River except possibly as adult strays or for juvenile non-natal rearing in the winter in or near the Sutter Bypass, and hence are not likely to be adversely affected by the proposed activities. North

American green sturgeon, if present in the Feather River, are likely to be in deep, turbulent pools, and hence are not likely to be adversely affected by the proposed activities. Central California Coast steelhead do not occur in the Feather River drainage.

D. Measures to Reduce the Impacts of the Study

The following measures will be implemented to reduce the impacts of the study and are true for each separate action area included in this research permit:

1. NMFS has reviewed the credentials of the principal investigators for the proposed research. All investigators are well qualified and have provided evidence of experience working with salmonids or the concepts outlined in the proposed project.

2. NMFS has developed nondiscretionary conditions for Permit 1180 that are necessary and appropriate to minimize take of listed salmonids, as described in the permit and Appendices A and B of the Central Valley Research Opinion. The investigators will ensure that all persons operating under Permit 1180 will be familiar with the terms and conditions therein.

3. NMFS will monitor project activities through the reports the applicant will provide to ensure that the project is operating satisfactorily in accordance with Permit 1180. NMFS will monitor actual annual take of ESA-listed or proposed fish species associated with the proposed research activities (as provided in annual reports or by other means) and will adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of the salmonids or green sturgeon.

4. All persons operating under Permit 1180 will be properly trained and have access to properly maintained state-of-the-art equipment.

Each study site has different methods and procedures which will be used, so in addition to the above mentioned measures, the following apply on an individual project basis:

1. Lower Putah Creek Fish Monitoring and Splittail Studies, Solano County Streams Fish Monitoring Study, Ulatis Flood Control Project Channel Fish Monitoring Study

- Field personnel are trained to ensure their familiarity with electrofishing (*e.g.* shocking, netting, and removing fish from water and into capture buckets within a minimal amount of time and exposure to electrical field).

- Capture buckets are filled with fresh creek water and equipped with bait bucket aerators/bubbler units to ensure oxygen rich holding environment to aid recovery from shocking and stress of holding.

- Capture buckets are monitored to ensure that when fish crowding occurs, sampling stops while buckets are emptied into a net pen located in a suitable location in the creek (within

main channel, in area of adequate stream flow, but without excessive velocity that might force fish against netting) outside the area being shocked.

- During the fish measurement/processing stage, field personnel make every attempt to find and remove any salmonids from the net pen first and these fish are processed first and allowed to begin the recovery process first.

- All salmonids are anaesthetized using a non-toxic CO_2 environment (3:1 solution of club soda) prior to handling.

- Only a few fish are anaesthetized at a time to ensure that fish are not allowed to remain in CO_2 solution too long.

- Handling of salmonids is done as rapidly as possible to reduce the time fish are handled and prone to stress.

- Measuring boards and containers used to hold fish during weighing are kept moistened to reduce loss of scales/mucous from fish.

- Weights of all salmonids <200 millimeters in length are obtained in a water filled container so that fish remain in an aquatic environment during weighing and can begin recovery sooner.

- After being weighed fish are removed to a recovery bucket of fresh creek water that is equipped with a bait bucket aerator/bubbler unit to ensure an oxygen rich environment to speed recovery.

- All salmonids are inspected prior to their release back to site of capture. No salmonids are released from the recovery buckets until they exhibit normal behavior and the ability to orient and swim under their own power.

- All sturgeon will be released immediately upon identification outside of the electrical exposure field with no further handling.

2. Oroville Facilities Relicensing Instream Flow Studies

- Field personnel are trained to recognize active salmonid redds and to make every attempt to avoid disturbing the egg pocket during either hydraulic data collection or habitat suitability criteria data collection.

- Sampling sites will be inspected for the presence of spawning adults, and if present, data will be collected with a minimum of disturbance.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

A. Listed Species

The issuance of Permit 1180 may potentially affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, or Central California Coast steelhead. NMFS has recently completed an updated status review of 16 salmon ESUs, including Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon, and concluded the species' status should remain as previously listed (70 FR 37160). On January 5, 2006, NMFS published a final listing determination for ten steelhead DPSs, including Central Valley and Central California Coast steelhead. The new listing determination will become effective on February 6, 2006 (71 FR 834), and concludes that the species' status should remain as previously listed. The Central Valley Research Opinion describes the status of the Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon ESUs, as well as the Central Valley steelhead DPS. The Central and Northern Coast Research Opinion describes the status of the Central California Coast steelhead DPS. The current status of the above listed salmonids, based on their risk of extinction, has not significantly improved since the species were listed (NMFS 2002, NMFS 2003a).

Population estimates in 2001 (8,224), 2002 (7,441), 2003 (8,218), and 2004 (7,701) show a recent increase in the escapement of winter-run Chinook salmon. The 2003 run was the highest since the listing. The population estimates from the RBDD counts has increased since 1986 (CDFG 2004b), there is an increasing trend in the five year moving average (491 from 1990-1994 to 5,451 from 1999-2003). Central Valley spring-run Chinook salmon have displayed broad fluctuations in abundance over time. Their numbers have ranged from lows of approximately 400 in 1966 and 3,000 in 1992 to highs of approximately 38,000 in 1982 and 34,000 in 1998, and recently number nearly 13,000 in 2002 (California Department of Fish and Game (CDFG) 1998, 2004). Central Valley steelhead declined from an average of approximately 11,000 adult fish in the late 1960s and 1970s, to approximately 2,000 fish through the early 1990s (McEwan 2001). Recent estimates from trawling data in the San Francisco-San Joaquin Delta suggest that over 3,600 female steelhead spawn in the Central Valley basin (Good *et al.* 2005). Central California Coast steelhead are estimated to have had an average run size of 94,000 for the entire DPS from 1959 through 1963, based on limited data from the 1965 California Fish and Wildlife Plan discussed by Good *et al.* (2005). Data from the 1990s for the Russian and San Lorenzo Rivers, which are thought to have supported the two largest populations of Central California Coast steelhead, suggest that those populations had declined to about 15 percent of their size 30 years earlier (Good *et al.* 2005). New analyses of trends for five independent Central California Coast steelhead populations for which sufficient 1990s time-series data was available indicate that juvenile densities all declined significantly (Good *et al.* 2005).

As discussed in the Central Valley Research Opinion, and Central and Northern Coast Research Opinion, factors affecting Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead include: (1) dam construction that blocks previously accessible habitat; (2) water development activities

that affect water quantity, water quality, and hydrographs; (3) land use activities such as agriculture, flood control, urban development, mining, and logging; (4) hatchery operation and practices; (5) harvest activities; (6) ecosystem restoration actions; (7) natural conditions; and (8) scientific research. Large dams are present on almost every major tributary to the Sacramento River, and block access to the upper portions of watersheds that represent approximately 80 percent of historical habitat. Water diversions directly entrain fish, and can affect habitat for example by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban, and other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed ESUs, increased population sizes, and consequently increased likelihood of survival and recovery.

Although, critical habitat has been designated for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead, the research activities described in this document will not result in any changes or effects to salmonid habitat. Therefore, NMFS will not discuss critical habitat further in this document.

B. Proposed Species

The issuance of Permit 1440 may potentially affect the Southern DPS of North American green sturgeon. This document describes the status of the proposed threatened Southern DPS of North American green sturgeon.

1. Species Life History, Population Dynamics, and Likelihood of Survival and Recovery

The Southern DPS of North American green sturgeon was proposed for listing on April 6, 2005 (70 FR 17386), and includes the North American green sturgeon population spawning in the Sacramento River basin and utilizing the Delta and Estuary. If the proposed listing is finalized, critical habitat will be designated and a recovery plan will be prepared for the Southern DPS of North American green sturgeon.

North American green sturgeon are widely distributed along the Pacific Coast and have been documented offshore from Ensenada Mexico to the Bering Sea and found only in rivers from British Columbia to the Sacramento River (Moyle 2002). As is the case for all sturgeon, North American green sturgeon are anadromous; however, they are the most marine-oriented of the sturgeon species (Moyle 2002). Based on sturgeon egg, larvae, and juvenile distribution in the

Sacramento River, CDFG (2002) indicated that Southern DPS North American green sturgeon spawn in late-spring and early-summer above Hamilton City possibly to Keswick Dam. Spawning is thought to occur in deep turbulent pools of the Sacramento River mainstem. After approximately 10 days, larvae begin feeding and growing rapidly. Young green sturgeon appear to rear for the first 1 to 2 months in the Sacramento River between Keswick Dam and Hamilton City (CDFG 2002). Juvenile sturgeon first appeared in USFWS sampling efforts at Red Bluff Diversion Dam primarily during June and July at lengths ranging from 24 to 31 mm fork length (CDFG 2002). Sampling efforts at Glen Colusa Irrigation District on the Sacramento River have yielded North American green sturgeon averaging approximately 29 mm with a peak in July (NMFS 2002). Trawling studies in the Estuary and Delta since 1980 have taken a total of 61 juvenile sturgeon ranging in size from 20 to 112 cm total length and although most juveniles are captured between April and October, they have been captured nearly every month of the year (CDFG 2002, IEP Relational Database search May 31, 2005). Juveniles spend between 1 and 4 years in fresh and estuarine waters and enter the marine environment at lengths of approximately 300 mm (NMFS 2002).

Population abundance information concerning the Southern DPS of North American green sturgeon is scant as described in the status review (NMFS 2002). Limited population abundance information comes from incidental captures of North American green sturgeon from the white sturgeon (*Acipenser transmontanus*) monitoring program by the CDFG sturgeon tagging program (CDFG 2002). CDFG (2002) utilizes a multiple-census or Peterson mark-recapture method to estimate the legal population of white sturgeon captures in trammel nets. By comparing ratios of white sturgeon to green sturgeon captures, CDFG provides estimates of adult and sub-adult North American green sturgeon abundance. Estimated abundance between 1954 and 2001 ranged from 175 fish to more than 8,000 per year and averaged 1,509 fish per year. Unfortunately, there are many biases and errors associated with these data, and CDFG does not consider these estimates reliable. Fish monitoring efforts at Red Bluff Diversion Dam and Glen Colusa Irrigation District on the upper Sacramento River have captured between 0 and 2,068 juvenile North American green sturgeon per year, mostly between June and July (NMFS 2002). The only existing information regarding changes in the abundance of the Southern DPS of North American green sturgeon includes changes in abundance at the John Skinner Fish Protection Facility between 1968 and 2001 (State facility). The estimated number of North American green sturgeon taken at the State Facility prior to 1986 was 732; from 1986 on, the average number was 47 (70 FR 17386). For the Tracy Fish Collection Facility (Federal facility), the average number prior to 1986 was 889; from 1986 to 2001 the average was 32 (70 FR 17386). In light of the increased exports, particularly during the previous 10 years, it is clear that North American green sturgeon abundance is dropping. Catches of sub-adult and adult North American green sturgeon by the IEP between 1996 and 2004 ranged from 1 to 212 green sturgeon per year (212 occurred in 2001); however, the portion of the Southern DPS of North American green sturgeon is unknown as these captures were primarily located in San Pablo Bay which is known to consist of a mixture of the Northern and Southern population segments. Additional analysis of North American green and white sturgeon taken at the State and Federal facilities indicates that take of both North American green and white sturgeon per acre-foot of water exported has decreased substantially since the 1960s (70 FR 17386).

2. Habitat Condition and Function

The freshwater habitat of North American green sturgeon in the Sacramento-San Joaquin drainage varies in function, depending on location. Spawning areas are currently limited to accessible upstream reaches of the Sacramento River, though historical reports of spawning occurring in the Feather River are unsubstantiated (NMFS 2002). Preferred spawning habitats thought to contain large cobble in deep cool pools with turbulent water (CDFG 2002, Moyle 2002). Eggs are broadcast and externally fertilized in relatively fast water (Moyle 2002).

Migratory corridors are downstream of the spawning areas and include the mainstem Sacramento River and the Estuary and Delta. These corridors allow the upstream passage of adults and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers which can include dams, unscreened or poorly screened diversions, and degraded water quality. Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their 1 to 4 year residence in fresh water. Rearing habitat condition and function may be affected by annual and seasonal flow and temperature characteristics.

3. Factors Affecting the Species and Critical Habitat

The principal inland factors for the decline in the Southern DPS of North American green sturgeon are reviewed in the proposed listing notice (70 FR 17386) and status reviews (NMFS 2002, NMFS 2005), and primarily consist of harvest, impassible barriers, adult migration barriers, insufficient flow, increased temperatures, and water diversions. Ocean and estuarine harvest of the Southern DPS of North American green sturgeon is considered a species-wide threat as both Southern and Northern DPS populations are captured as a result of white sturgeon fishing (NMFS 2005). Recent genetic and population information indicates catches in San Pablo Bay could be fish that originated in the Northern DPS. The impassible barriers, primarily Keswick and Shasta Dams likely block and prevent access to spawning habitat. Adult migration barriers such as the Red Bluff Diversion Dam, Sacramento Deep Water Ship Channel locks, Fremont Weir, Sutter Bypass, and the Delta Cross Channel Gates also pose threats to the North American green sturgeon as they prevent or delay upstream migration (70 FR 17386). The high number and density of unscreened and screened agricultural and municipal water diversions likely increase stress levels, injury, and harassment of North American green sturgeon and also contribute toward altered hydrology patterns and increased temperatures. Other potential factors limiting the Southern DPS include non-native species interactions, poaching, pesticides and heavy metals, and local fishing pressure.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species within the action area. The environmental baseline "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the

action area that have already undergone formal or early section 7 consultation, and the impact of State of private actions which are contemporaneous with the consultation in process" (50 CFR 402.02). A detailed discussion of the factors affecting Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead is provided in section V (*Environmental Baseline*) of the Central Valley Research Opinion. A detailed discussion of the factors affecting Central California Coast steelhead is provided in section V (*Environmental Baseline*) of the Central and Northern Coast Research Opinion.

A. Listed Species

1. Status of the Species within the Action Area

a. *Lower Putah Creek Fish Monitoring and Splittail Studies*

Although Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon have not been documented in Putah Creek, Sommer *et al.* (2001) has shown that during wet years juveniles of all runs of Chinook salmon in the Sacramento River basin use the Yolo Bypass as a migration corridor. Central Valley steelhead historically occurred in the Putah Creek basin, although there are few confirmed records of their presence. Resident rainbow trout currently are present. Putah Creek currently supports a small run of Central Valley fall-run Chinook salmon (*O. tshawytscha*). The creek has adequate water and flow to support this population, but presence has been intermittent over the past few years (Moyle 2004).

During most of the year, lower Putah Creek is dammed within the Yolo Bypass, about 38 km downstream of Solano Diversion Dam, by a flashboard dam to divert water for agricultural purposes. While in place, the flashboard dam inhibits the inward and outward movement migrating fish, but it is removed each fall to coincide with attraction flows for Central Valley fall-run Chinook salmon.

b. *Solano County Streams Fish Monitoring Study*

Suisun Creek, Green Valley Creek, and Ledgewood Creek are inhabited by Central California Coast steelhead. The fish are likely to use these creeks for spawning and rearing. Steelhead/rainbow trout have been captured at several sites in Green Valley and Suisun Creeks over the past several years of study (TRPA 2002).

c. *Ulatis Flood Control Project Channel Fish Monitoring Study*

No Central Valley steelhead/rainbow trout have been collected in any of the sites which have been sampled in the Ulatis Flood Control Project Area (TRPA 2002). City of Vacaville staff reported seeing four to six steelhead in Ulatis Creek in downtown Vacaville in 1997 (*i.e.*, a high flow year) upstream of the action area (Bob Farrington, City of Vacaville, pers. comm., June 5, 2001). Fall-run Chinook salmon have been observed in the area in the past, but no winter- or spring-run Chinook salmon are known to occur in the basin.

d. *Oroville Facilities Relicensing Instream Flow Studies*

The action area contains populations of Central Valley spring-run Chinook salmon and Central Valley steelhead from the Feather River. The action area is a migratory corridor for adult Central Valley spring-run Chinook salmon and Central Valley steelhead, and provides migration and rearing habitat for juveniles of these species. Juvenile Sacramento River winter-run Chinook salmon may rear in the lower reaches of the Feather River during some months. Following is a status summary of these species and their habitat within the action area.

(1) *Sacramento River Winter-run Chinook Salmon.* There are no records of winter-run Chinook salmon in the Feather River. Moore (1997) and Maslin *et al.* (1996, 1997) found that juvenile winter-run Chinook salmon rear in non-natal tributaries to the Sacramento River during winter and early spring months. Due to the proximity of the action area to the Sacramento River, it is possible that adult strays, or non-natal juveniles may occur between December and February in some years.

(2) *Central Valley spring-run Chinook Salmon.* The number of naturally-spawning spring-run Chinook salmon in the Feather River has been estimated only periodically since the 1960s, with estimates ranging from 2 fish in 1978 to 2,908 fish in 1964. Adult spring-run Chinook salmon that return to the Feather River Fish Hatchery have been counted each year since 1963, and their numbers have ranged from 146 in 1967 to 8,662 in 2003 (CDFG 2004a). Hatchery-spawned juvenile spring-run Chinook salmon are transported by truck and released downstream in San Francisco Bay, and so do not rear in the Feather River.

The majority of in-river spring-run Chinook salmon spawning is concentrated in the uppermost three miles of accessible habitat in the Feather River below the Feather River Fish Hatchery (California Department of Water Resources (CDWR) 2001). The genetic integrity of this population is at question because there is significant temporal and spatial overlap between spawning populations of spring- and fall-run Chinook salmon (Good *et al.* 2005).

Based on observations of spring-run Chinook salmon immigration in the Sacramento River, adults are likely to migrate upstream through the action area during the period between February and July where they hold in deep coldwater pools until spawning begins in mid- to late August. Most pre-spawning spring-run Chinook salmon adults hold in the upper three miles of the low flow channel (Bureau of Reclamation 2004). Cooler temperatures near the upper end of the low flow channel during the summer provide suitable holding conditions throughout the summer months and provide the coldest water available during September for the initiation of spawning. For spring-run Chinook salmon, spawning primarily occurs during September and emergence of fry from redds is predicted for December and January. Results from Feather River Chinook salmon emigration studies indicate virtually all spring-run Chinook salmon juveniles in the Feather River exit as sub-yearlings. Emigration of young-of-year begins immediately following emergence in late November, peaks in January or February, and continues through June (CDWR 1999a, b, c).

(3) *Central Valley Steelhead.* Limited information exists regarding the abundance, location, and timing of steelhead spawning within the Feather River. The only reliable information available on in-river adult abundance since the construction of Oroville Dam is from steelhead redd surveys conducted by CDWR in 2003 (CDWR 2003). Based on these surveys, CDWR estimated that a minimum of 163 steelhead spawned in the Feather River in 2003. Nearly half (*i.e.*, 48 percent) of all redds were located in the uppermost mile of existing anadromous habitat below the Feather River Fish Barrier Dam. The Feather River Fish Hatchery maintains records of the number of steelhead that have entered the hatchery annually since 1967. Feather River Fish Hatchery counts since 1969 ranged from a low of 78 to a high of 2,587, with an average of 904 adults per year (CDWR 2001).

Steelhead adults migrate upstream in the Sacramento River during the period between December and March to spawn and are likely to enter into the Feather River during the same period. Most steelhead return to the Feather River Fish Hatchery and very limited information exists regarding their location, timing, and magnitude of spawning within the river. Observations to date suggest that the low flow channel is the primary reach for steelhead spawning, with up to 75 percent of the spawning occurring in the side channel adjacent to the Feather River Fish Hatchery (CDWR 2003).

The Chinook salmon emigration studies in the Feather River during the period of 1995 through 1998 have indirectly captured steelhead young-of-year and yearlings. Young-of-year were captured from March through June, while yearlings were captured January through June. Steelhead were not captured during the period between October and December (CDWR 1999 a, b, c). Based on these results and steelhead emigration patterns in the Sacramento River, steelhead juveniles and smolts are expected to emigrate from the Feather River to the lower Sacramento River and Delta from December through March.

2. Factors Affecting the Species Within the Action Area

The Central Valley Research Opinion, and Central and Northern Coast Research Opinion describe the ongoing activities and historical events that have affected listed salmonids. Factors of particular importance in the action area discussed in this biological opinion are briefly discussed below.

a. *Lower Putah Creek Fish Monitoring and Splittail Studies, Solano County Streams Fish Monitoring Study, and Ulatis Flood Control Project Channel Fish Monitoring Study*

Land use activities, in particular, are the biggest factor affecting salmonid fishes in lower Putah Creek and the Yolo Bypass, Solano County streams, and the Ulatis Creek drainage. Increased sedimentation resulting from agricultural and urban practices within the Putah Creek basin is a primary cause of salmon habitat degradation. Embedded substrates can reduce the ability of salmon to reproduce and the ability of juveniles to hide in the gravel to avoid predators.

Agricultural and urban surface water runoff is associated with increased water temperature, decreased dissolved oxygen levels, and increased turbidity and contaminant loads in the water bodies in and around the Central Valley, all of which reduce habitat quality for salmonids.

Juvenile salmonids are exposed to increased water temperatures in streams during the late spring and summer due to the loss of riparian shading, and by thermal inputs from municipal, industrial, and agricultural discharges. The Ulatis Creek drainage in particular is highly channelized and largely devoid of vegetation.

b. *Oroville Facilities Relicensing Instream Flow Studies*

Two activities described in the Central Valley Research Opinion, water diversion projects in the Sacramento-San Joaquin Delta and hatchery operations in the Feather River, have the largest potential impacts to the populations of listed salmonids in the action area. Namely, operation of the State Water Project's Oroville Facility alters historical flow patterns that affect the timing of juvenile outmigration and direction of adult upstream migration of salmonids. Secondly, the large numbers of fish released from the Feather River Fish Hatchery can pose a threat to wild salmonids through genetic impacts such as inbreeding, and increased competition, predation, and fishing pressure that result from hatchery production. Additionally, the Feather River Fish Barrier Dam interrupts the upstream migration of spring- and fall-run Chinook salmon in the Feather River, forcing both in-river populations to occupy and utilize the same holding and spawning habitat. This is thought to contribute to significant spatial and temporal overlap of spring- and fall-run Chinook salmon spawning in the Feather River that is likely to have led to the homogenization of the races over time (CDWR 2001, NMFS 2003).

B. Proposed Species

1. Status of the Species within the Action Area

a. *Lower Putah Creek Fish Monitoring and Splittail Studies*

The Southern DPS of North American green sturgeon utilizes the mainstem Sacramento River downstream of the town of Knights Landing as an adult migration corridor and juvenile migration and rearing corridor. Knights Landing is approximately 5 miles upstream of the Fremont Weir, through which the Sacramento River floods into the Yolo Bypass during high winter flows. Southern DPS North American green sturgeon use the Sacramento-San Joaquin Delta (*i.e.*, the location of the Yolo Bypass) as a juvenile rearing and migration corridor and as an adult migration and feeding corridor as well. The portion of the North American green sturgeon population utilizing the interior Delta (as opposed to the mainstem Sacramento River) is unknown; however, it is thought to be comprised of a fraction of the Southern DPS population. Overall, it is likely that green sturgeon, as with many other Sacramento River species, may use the Yolo Bypass as a migration and rearing corridor when the bypass is flooded. It is unlikely that green sturgeon, a large river species, would inhabit Putah Creek itself. The applicant has have never observed or encountered any green or white sturgeon during any of their sampling

activities in Yolo Bypass or lower Putah Creek (Tim Salamunovich, Fisheries Biologist, Thomas R. Payne & Associates, pers. comm., October 25, 2005).

b. *Solano County Streams Fish Monitoring Study and Ulatis Flood Control Project Channel Fish Monitoring Study*

It is unlikely that green sturgeon, a large river species, would inhabit Suisun Creek, Green Valley Creek, Ledgewood Creek, or Ulatis Creek.

c. *Oroville Facilities Relicensing Instream Flow Studies*

The applicant has have never observed or encountered any green or white sturgeon during any of their sampling activities in the Feather River (Tim Salamunovich, Fisheries Biologist, Thomas R. Payne & Associates, pers. comm., October 25, 2005).

V. EFFECTS OF THE PROPOSED ACTION

Pursuant to section 7(a)(2) of the ESA (16 U.S.C. 1536), Federal agencies are directed to ensure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. This biological opinion tiers to the Central Valley Research Opinion and assesses the effect of issuing Permit 1180 on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. The studies listed in this biological opinion are likely to take Federally-listed species through capture during collection and monitoring.

Regulations that implement section 7(b)(2) of the ESA require biological opinions to evaluate the direct and indirect effects of Federal actions and actions that are interrelated with or interdependent to the Federal action to determine if it would be reasonable to expect them to appreciably reduce listed species' likelihood of surviving and recovering in the wild by reducing their reproduction, numbers, or distribution (16 U.S.C. §1536; 50 CFR 402.02).

A. Project Specific Effects

1. Lower Putah Creek Fish Monitoring and Splittail Studies, Solano County Streams Fish Monitoring Study, and Ulatis Flood Control Project Channel Fish Monitoring Study

The lower Putah Creek Fish Monitoring and Splittail Studies may result in the capture and handling of juvenile salmonids. Juveniles are expected to be harassed, harmed, or killed due to capture with barge electroshockers. No take of any salmonids is expected from the light traps used in the splittail studies. If juvenile or adult salmonids are present in the action area, they are expected to effectively avoid those traps.

The electrofishing surveys in lower Putah Creek will be conducted during a single fall survey in October. Possible effects to fish from electrofishing include bruising if the fish directly contacts

electrofisher anodes, and exhaustion from repeated shocking. Electrofishing also has been shown to affect fish physiology (Bouck and Ball 1966, Schreck *et al.* 1976, Mesa and Schreck 1989), stamina (Horak and Klein 1967), behavior (Bouck and Ball 1966, Mesa and Schreck 1989), and growth (Gatz *et al.* 1986, Dalbey *et al.* 1996). However, the effects of electrofishing on fish depend on the life stage, size, and species of fish, and sampling methods employed (*e.g.*, duration of capture and handling sequence, sampling frequency, operator skill, and electrical settings; Nielsen 1998). For example, Kocovsky *et al.* (1997) found no population-level effects on estimated salmonid abundance after 8 years of electrofishing surveys, despite the incidence of sublethal spinal injuries through time. Furthermore, although less studied, the effects of electrofishing on juvenile fish primarily are stress-related, compared to the more invasive spinal injuries commonly observed in adult fish (Nielsen 1998).

Sampling protocols which are listed in section III (*Description of the Proposed Action*) are expected to minimize the stress and mortality of captured fish. Adherence to similar procedures in work by the California Department of Water Resources has resulted in capture-related mortalities of less than 3 percent for adult salmonids and less than 7 percent for juvenile salmonids (NMFS 2003b).

The Solano County Streams and the Ulatis Flood Control Project study elements may result in the capture and handling of juvenile salmonids. Salmonids may be captured and may be injured using backpack mounted electrofishing equipment and seines. The effects of a backpack mounted electrofishing are discussed in the Central Valley Research Opinion. The precautions and care which will be taken during sampling will also reduce any likelihood that the take will result in significant loss to the species at an ESU or DPS level.

The potential impacts of electrofishing (*i.e.*, both barge and backpack) to salmonids from this project primarily will be limited to temporary (*i.e.*, nonlethal) impacts to a few juvenile Central Valley steelhead. Although Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon may occur in the Yolo Bypass (*i.e.*, in lower Putah Creek) when the bypass floods in winter, they are not expected to occur in Putah Creek in October or at all in the Solano County streams (including Ulatis Creek) that are part of this consultation. Therefore, Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon are not likely to be adversely affected by the project activities proposed for these areas. The numbers in the populations of the listed species which are affected in the action area will not be appreciably reduced. This project is not likely to reduce the likelihood of survival and recovery of the Sacramento River winter-run Chinook salmon ESU, Central Valley spring-run Chinook salmon ESU, and Central Valley steelhead DPS.

3. Oroville Facilities Relicensing Instream Flow Studies

The instream flow study proposed for the Feather River will involve: (1) observing salmon and steelhead via snorkeling or diving; and (2) the collection of hydraulic data at a minimum of three different stream flows (*i.e.*, at various times of year) when spawning, incubating, or rearing Central Valley spring-run Chinook salmon or Central Valley may be present. Direct observation from snorkel surveys or diving is one of the least intrusive methods used to collect data on fish.

Disturbances typically are minor (*i.e.*, the fish simply move away) and short-lived. Although key behaviors such as spawning or feeding may be disrupted, the fish will not be captured or handled.

On the other hand, snorkel surveys will involve walking or swimming probably by two or three researchers through stream habitat units. Similarly, to collect hydraulic data, researchers likely will walk or wade alongside and in the Feather River as they obtain flow and depth measurements. Injury from trampling of eggs and larvae may potentially occur, but is expected to be unlikely because redds should provide adequate protection for these life stages from disturbances limited to the activities of a limited number of people. Also, the researchers are experienced and generally are expected to identify redds and avoid walking through them. However, disturbances by swimming or walking researchers are likely to frighten juvenile and adult spring-run Chinook salmon and steelhead, which may cause the fish to seek temporary refuge behind rocks, vegetation, or in deep-water areas within habitats. Frightened juveniles are expected to return to feeding stations, and adults resume normal holding and spawning behavior within minutes after the observer passes through the habitat unit. In some cases, fish may temporarily leave the particular pool or habitat type when observers are in their area, but generally this is not anticipated because of the brief, minor, and localized nature of the disturbances. None of the activities described above are anticipated to have adverse effects that are severe enough to cause injury to Central Valley spring-run Chinook salmon or Central Valley steelhead.

In conclusion, the requested amount of take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead resulting from the research activities covered in the application for Permit 1180 and this biological opinion is not expected to result in a significant effect at the scale of the ESU or DPS because capture rate is expected to be low relative to the overall abundance of the species and the mortality rate is expected to be a very small percentage of the fish captured.

B. Beneficial Effects of Issuing the Permit

There must be an obvious benefit to the species in order to consider authorizing the intentional capture of ESA-listed species and potential removal of those individuals from the population. The use of ESA-listed species for scientific research is consistent with the purpose of the ESA when the research facilitated recovery of an ESA-listed species.

The purpose of these studies is to monitor the distribution and relative abundance of fish populations in the different stream reaches and in the case of the Oroville Studies, to review and evaluate the adequacy of the existing data used in previous instream flow studies for the lower Feather River. Results of these studies will contribute to the knowledge base that is currently available regarding the life histories and habitat needs of the species. Information on abundance and population structure is the highest priority data need for recovery planning and conservation needs for salmonids. The studies proposed by TRPA address some of these data needs. Having information such as the data available from this study available to managers will reduce uncertainty in management decisions in the future.

VI. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operations of hatcheries, water diversions, and some land management activities, will be reviewed through separate section 7 consultation processes and not considered here. Similarly, non-Federal actions that require authorization under section 10 will be evaluated in separate section 7 consultations and not considered here. A general summary of potential cumulative effects that may affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast Steelhead within the action area is described in the Central Valley Research Opinion. They include ongoing agricultural and urban activities that likely will continue to affect stormwater runoff patterns and water quality in the action area, and future population growth that will result in new urban development and increased disturbance of waterways and riparian areas, as well as stormwater and water quality impacts.

VII. CONCLUSION

A. Listed Species

After reviewing the best available scientific and commercial information, the current status of the species, the environmental baseline for the action areas, the effects of the proposed issuance of Permit 1180, and the cumulative effects, it is NMFS's biological opinion that the issuance of Permit 1180, as proposed, is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast Steelhead and is not likely to destroy or adversely modify their designated critical habitat.

B. Proposed Species

After reviewing the best available scientific and commercial information, the current status of the species, the environmental baseline for the action areas, the effects of the proposed issuance of Permit 1180, and the cumulative effects, it is NMFS's biological opinion that the issuance of Permit 1180, as proposed, is not likely to jeopardize the continued existence of North American green sturgeon.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt

to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement. The issuance of Permit 1180 authorizes intentional take of Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with TRPA's proposed research activities. The action of issuing Permit 1180 does not anticipate incidental take of endangered or threatened species. This biological opinion does not authorize any taking of a listed species under section 10(a) or immunize any actions from the prohibitions of section 9(a) of the ESA.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the proposed issuance of Permit 1180. As provided in 50 CFR 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of taking specified in any incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

X. LITERATURE CITED

Bouck, G.R., and R.C. Ball. 1966. Influence of capture methods on blood characteristics and mortality in the rainbow trout (*Salmo gairdneri*). Transactions of the American Fisheries Society 95:170-176.

Bovee, K.D. 1982. A guide to Stream Habitat Analysis Using the Instream Flow Incremental Methodology. Instream Flow Information Paper No. 12. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS/82/86. 248 pp.

Bureau of Reclamation. 2004. Long Term Central Valley Project and State Water Project Operating Criteria and Plan, Biological Assessment. U.S. Department of Interior, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California.

California Department of Fish and Game. 1970. Region II Letter to R. Kroll and J.E. Wiggins, Dixon Game Conservation Club, dated March 25, 1970. CDFG Region II files, Rancho Cordova.

California Department of Fish and Game. 1998. Report to the Fish and Game Commission. A status review of the spring-run Chinook salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage. Candidate species status report 98-01.

California Department of Fish and Game. 2004a. Preliminary unpublished data: Adult Chinook salmon populations in the Sacramento/San Joaquin River systems. Native Anadromous Fish and Watershed Branch. Sacramento, California.

California Department of Fish and Game. 2004b. Sacramento River winter-run Chinook salmon 2002-2003 biennial report. Prepared for the California Fish and Game Commission. Habitat Conservation Division, Native Anadromous Fish and Watershed Branch. Sacramento, 22 pages.

California Department of Water Resources. 1999a. Feather River Study, Chinook Salmon Emigration Survey, March - June 1996. Draft report. June 1999.

California Department of Water Resources. 1999b. Feather River Study, Chinook Salmon Emigration Survey, October - December 1996. Draft report. June 1999.

California Department of Water Resources. 1999c. Feather River Study, Chinook Salmon Emigration Survey, December 1997 - June 1998. Draft report. June 1999.

California Department of Water Resources. 2001. Initial Information Package for the Relicensing of the Oroville Facilities, FERC No. 2100.

California Department of Water Resources. 2003. SP F-10 Task 2B Report. 2003 Lower Feather River Steelhead (*Oncorhynchus mykiss*) Redd Survey. Oroville Facilities Relicensing, FERC No. 2100.

Dalbey, S.R., T.E. McMahon, and W. Fredenberg. 1996. Effect of electrofishing pulse shape and electrofishing-induced spinal injury on long-term growth and survival of wild rainbow trout. North American Journal of Fisheries Management 16:560-569.

Gatz, A.J. Jr., J.M. Loar, and G.R. Cada. 1986. Effects of repeated electroshocking on instantaneous growth of trout. North American Journal of Fisheries Management 6:176-182.

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-66, 598 pp.

Horak, D.L., and W.D. Klein. 1967. Influence of capture methods on fishing success, stamina, and mortality of rainbow trout (*Salmo gairdneri*) in Colorado. Transactions of the American Fisheries Society 96:220-222.

Kocovsky, P.M., C. Gowan, K.D. Fausch, and S.C. Riley. 1997. Spinal injury rates in three wild trout populations in Colorado after eight years of backpack electrofishing. North American Journal of Fisheries Management, 17:308-313.

Maslin, P.E., W.R. McKinney, and T.L. Moore. 1996. Intermittent streams as rearing habitat for Sacramento River chinook salmon. Department of Biology, California State University, Chico. Available: http://www.csuchico.edu/~pmaslin/rsrch/Salmon/Abstrct.html.

Maslin, P.E., W.R. McKinney, and T.L. Moore. 1997. Intermittent streams as rearing habitat for Sacramento River chinook salmon. Department of Biology, California State University, Chico. Available: http://www.csuchico.edu/~pmaslin/rsrch/Salmon/Abstrct.html.

McEwan, D.R. 2001. Central Valley Steelhead. Contributions to the biology of Central Valley salmonids. R. Brown editor, California Department of Fish and Game Fish Bulletin No. 179.

Mesa, M.G., and C.B. Schreck. 1989. Electrofishing mark-recapture and depletion methodologies evoke behavioral and physiological changes in cutthroat trout. Transactions of the American Fisheries Society 118:644-658.

Meyer, F. 1990. History and status of Putah Creek fishery. California Department of Fish and Game Memorandum dated 13 July 1990. CDFG, Region II files. Rancho Cordova, California.

Moore, T.L. 1997. Condition and feeding of juvenile chinook salmon in selected intermittent tributaries of the upper Sacramento River. M.S. Thesis, California State University, Chico.

National Marine Fisheries Service. 2002. Memorandum dated October 22, 2002, from Rodney R. McInnis to The Record. Endangered Species Act section 7 programmatic biological opinion on the issuance of section 10(a)(1)(A) scientific research permits for take of threatened Central California Coast coho salmon, threatened Southern Oregon/northern California Coasts coho salmon, threatened California Coastal Chinook salmon, threatened Central California Coast steelhead, and threatened Northern California steelhead.

National Marine Fisheries Service. 2003a. Memorandum dated September 5, 2003, from Rodney R. McInnis to The Record. Endangered Species Act section 7 programmatic biological opinion on the issuance of section 10(a)(1)(A) scientific research permits for take of endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley steelhead.

National Marine Fisheries Service. 2003b. Memorandum dated May 15, 2003 from Rodney R. McGinnis to The Record, SWR-01-5638:HLB. Endangered Species Act section 7 biological opinion on the issuance of section 10(a)(1)(A) scientific research permit for endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley steelhead.

Nielsen, J.L. 1998. Scientific sampling effects: Electrofishing California's endangered fish populations. Fisheries Management, 23(12):6-12.

Salamunovich, Tim. 2002. Application for Modification of Existing Permit 1180. Thomas R. Payne & Associates, Arcata, California.

Schreck, C.B., R.A.Whaley, M.L. Bass, O.E. Maughan, and M. Solazzi. 1976. Physiological responses of rainbow trout (*Salmo gairdneri*) to electroshock. Journal of the Fisheries Research Board of Canada 33:76-84.

Small, K. M., P. K. Crain, and P. B. Moyle. 2004. Chinook Salmon in Putah Creek, Spring, 2004. Report to Putah Creek Coordinating Committee.

Sommer, T., B. Harrell, M. Nobriga, R. Brown, P. Moyle, W. Kimmerer, and L. Schemel. 2001. California's Yolo Bypass: Evidence that Flood Control can be Compatible with Fisheries, Wetlands, Wildlife, and Agriculture. Fisheries 26(8): 6-16.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, California 95814-4706

February 15, 2006

MEMORANDUM FOR: Rodney R. McInnis
Regional Administrator
Southwest Region
National Marine Fisheries Service

THROUGH: Russell M. Strach
Assistant Regional Administrator
Southwest Region, Protected Resources Division
National Marine Fisheries Service

FROM: Michael E. Aceituno
Supervisory Fishery Management Specialist

SUBJECT: Transmittal of a Recommendation on an Application from Thomas R. Payne and Associates for Scientific Research Permit No. 1180 under the Provisions of Section 10(a)(1)(A) of the Endangered Species Act. 151422SWR03SA8829:SRB

ABSTRACT

NOAA's National Marine Fisheries Service (NMFS), Southwest Region (SWR), Protected Resources Division (PRD) recommends issuance of a section 10(a)(1)(A) Research Permit No. 1180 (Permit 1180) under the Endangered Species Act (ESA) to Thomas R. Payne and Associates (TRPA). The activities proposed in this permit include take of adult and juvenile Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), Central Valley steelhead (*O. mykiss*) and Central California Coast steelhead (*O. mykiss*) associated with a variety of research activities throughout the Central Valley and the Sacramento-San Joaquin Delta (Delta).

BACKGROUND

On August 23, 2002, TRPA submitted a request to modify Permit 1180 which was originally

BACKGROUND

On August 23, 2002, TRPA submitted a request to modify Permit 1180 which was originally issued on February 11, 1999. The modification would authorize a research project intended to describe the distribution and abundance of salmonids within five watersheds in central California. Since the proposed research includes significant changes in locations relevant to previously analyzed activities and includes a request for take of an additional species, Central Valley spring-run Chinook salmon, NMFS determined that the TRPA request constitutes a major modification request, which is process ed the same manner as a new permit. Permit 1180 authorizes TRPA to take listed salmonids while conducting a variety of research activities throughout the Central Valley and the Delta.

In particular, TRPA proposes to conduct fisheries-related studies in four different stream systems to provide ecological information for various agencies which have projects in the areas. These include long-term monitoring projects and short-term projects to study the trends in abundance and distribution of anadromous and resident fishes (*e.g.*, Sacramento splittail, Chinook salmon). There are four long-term monitoring projects that are projected to continue through 2010, as allowed by this permit. A summary of the study objectives, study location, sampling time and frequency, and sampling gear used for each project is provided in Table 1 of the Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research for Permit 1180. The information gathered on salmonids will be useful in managing for the recovery of listed salmonid populations throughout Central California.

PROPOSED ACTION

NMFS SWR PRD proposes to issue Permit 1180 to TRPA for the proposed project as provided by section 10(a)(1)(A) of the ESA.

STATUS OF THE SPECIES

The current status of listed salmonids, based on their risk of extinction, has not significantly improved since the species were listed (Good *et al.* 2005). Although the number of Sacramento River winter-run Chinook salmon has increased in the last 7 years, the ESU remains at risk of extinction. Sacramento River winter-run Chinook salmon run size declined from a high of approximately 118,000 fish in 1969 to a low of fewer than 200 fish in 1994, and has recently increased to over 8,000 fish in 2003 (California Department of Fish and Game (DFG) 2004 unpublished data). Central Valley spring-run Chinook salmon have displayed broad fluctuations in abundance over time. Their numbers have ranged from approximately 1,500 in 1992 to approximately 25,000 in 1998, and recently number nearly 9,000 in 2003 (DFG unpublished data). Central Valley steelhead declined from an average of approximately 11,000 adult fish in the late 1960s and 1970s, to approximately 2,000 fish through the early 1990s (McEwan 2001).

Recent estimates from trawling data in the San Francisco-San Joaquin Delta indicate that over 3,600 female steelhead spawn in the Central Valley basin (Good *et al.* 2005). Estimates of Central California Coast steelhead DPS have approximated 94,000 fish in the 1960s and numbers have declined to less than 5,500 in recent times (Busby *et al.* 1996). Although their abundance is low, Central California Coast steelhead are fairly well distributed throughout their current range. The DPS's relatively broad distribution is a positive indicator of the species likelihood of survival and recovery in the wild (62 FR 43937).

The factors affecting the species and their habitats include: (1) dam construction that blocks previously accessible habitat; (2) water development activities that affect water quantity, water quality, and hydrographs; (3) land use activities such as agriculture, flood control, urban development, mining, and logging; (4) hatchery operation and practices; (5) harvest activities; (6) ecosystem restoration actions; (7) natural conditions; and (8) scientific research. Large dams are present on almost every major tributary to the Sacramento and San Joaquin Rivers, and block salmon and steelhead access to the upper portions of watersheds that represent approximately 80 percent of historical habitat. For the Central California Coast steelhead DPS in particular, dams in the Russian River are among the main factors affecting the DPS. Water diversions directly entrain fish, and can affect habitat by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban areas, as well as other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed DPSs, increased population sizes, and consequently increased likelihood of survival and recovery.

The proposed permitted research activities are not expected to result in any changes or effects to salmonid habitat including critical habitat for Sacramento River winter-run Chinook salmon. Therefore, critical habitat is not likely to be affected by issuance of Permit 1180.

COMMENTS

NMFS published a notice of receipt of TRPA's permit application in the *Federal Register* on September 9, 2002 (68 FR 49438), announcing the beginning of a thirty-day public comment period. No comments were received.

ESA SECTION 7 CONSULTATION

TRPA proposes to take Federally protected anadromous salmonids listed as endangered Sacramento River winter-run Chinook salmon and threatened Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead under the ESA. The taking of these salmonids was prohibited, pursuant to section 4(d) and section 9 of the ESA, on November 5, 1990 (55 FR 46515), for Sacramento River winter-run Chinook salmon, January 9, 2002 (67 FR 1116), for Central Valley spring-run Chinook salmon, and July 10, 2000 (65 FR 42422), for Central Valley steelhead and Central California Coast steelhead.

The consultation addressing the effects of issuing Permit 1180, transmitted herewith, concludes that the cumulative annual take associated with scientific research activities is not likely to jeopardize the continued existence of ESA-listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead.

NATIONAL ENVIRONMENTAL POLICY ACT

Issuance of an incidental take permit under Section 10(a)(1)(A) of the Endangered Species Act is considered a major Federal action with potentially significant impacts to the human environment and is therefore subject to compliance with the National Environmental Policy Act (NEPA). The regulations for NMFS' implementation of NEPA are established primarily through the President's Council on Environmental Quality (CEQ) and further elaborated in NOAA's Administrative Order 216-6 (NAO 216-6).

NMFS has determined through experience that certain categories of projects or other actions do not typically have the potential for a significant impact on the quality of the human environment and therefore may be categorically excluded from more extensive review and analysis, such as the preparation of either an environmental assessment or an environmental impact statement.

Before an action may be determined to be categorically excluded from further NEPA review, NMFS must comply with Section 5.05c of NAO 216-6 and determine whether there may be "exceptional circumstances" associated with the proposed action that could result in potentially significant adverse resource impacts. Relevant factors for making such a determination are described in Section 5.05b of NAO 216-6, and include the following:

(1) a prior NEPA analysis for the same action demonstrated that the action will not have significant impacts on the quality of the human environment (considerations in determining whether the proposed action is the same as a prior action may

include, among other things, the nature of the action, the geographic area of the action, the species affected, the season, the size of the area, *etc.*); or

(2) the proposed action is likely to result in significant impacts as defined in 40 CFR 1508.27 (CEQ NEPA Regulations).

NMFS has considered the proposed action from the perspective of both context and intensity, as required in CEQ 1508.27, specifically taking into account the following factors:

(1) impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial;
(2) the degree to which the proposed action affects public health or safety;
(3) unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;
(4) the degree to which the effects on the quality of the human environment are likely to be highly controversial;
(5) the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks;
(6) the degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration;
(7) whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts;
(8) the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources;
(9) the degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973;
(10) whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Finally, in consideration of applying NOAA's Exclusion Category 6.03.e.3(b) to this action, NMFS further considered the cumulative impact on the listed species from the total amount of incidental take permits already issued and which have been categorically excluded and have taken into account any potential population shifts with the subject species.

The proposed action will not adversely affect public health or safety. The research activities will

not directly or indirectly adversely affect any unique features of the geographic area, including ecologically critical areas. Implementation of the research components will not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor will it cause loss or destruction of significant scientific, cultural, or historical resources. The action will not threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The proposed scientific research is not controversial. The proposed research will not have an effect on the quality of the human environment, nor will it involve any unique or unknown risks. The proposed research does not establish a precedent for future actions and will not have a cumulatively adverse significant impact on the species or their ecosystems. Species affected are listed as endangered and threatened under the ESA, but no significant short- or long-term negative effects are anticipated. The permit holder is required to coordinate the research with other researchers conducting similar activities in order to prevent unnecessary duplication or significant adverse cumulative impacts. The benefits derived from the proposed research are expected to contribute to the knowledge of the species and toward the reduction of human-induced mortalities of fish associated with other activities.

NMFS concludes that the research is important and necessary and that the results will contribute to the growing body of knowledge associated with research on ESA-listed anadromous fish populations. It is expected that the proposed research will not cause any significant adverse environmental impacts and does not come within any of the exceptions to Categorical Exclusion 6.03.e.3(b). Based on the foregoing, NMFS has determined that an environmental assessment or an environmental impact statement is not warranted for the take of ESA-listed anadromous fish species associated with the proposed scientific research.

A checklist of the NEPA review is provided in Appendix I of this document.

COORDINATION WITH THE UNITED STATES FISH AND WILDLIFE SERVICE

The proposed research activities in the Solano County streams will not result in jeopardy of any Federally listed species under U.S. Fish and Wildlife Service's (USFWS) jurisdiction as written in their biological opinion dated March 19, 1999 (pers. comm., Messrs. Tim Salamanovich and Tom Payne, TRPA, October 21, 2005). The USFWS biological opinion is effective from March 1, 1999, through February 29, 2024.

The remainder of the proposed research activities covered in this permit do not have any USFWS-listed species present in the sampling areas.

COORDINATION WITH NATIONAL OCEAN SERVICE

The research activities proposed by TRPA will not be conducted in or near a National Marine Sanctuary. Therefore, NMFS SWR PRD has determined that the proposed research activities will not result in an adverse impact to any National Marine Sanctuary resource.

COORDINATION WITH THE SOUTHWEST FISHERIES SCIENCE CENTER

NMFS SWR PRD consulted with NMFS Southwest Fisheries Science Center (SWFSC) Laboratory at Santa Cruz, California regarding this permit. The SWFSC provided no substantive comments on this permit request.

MAGNUSON-STEVENS ACT

The activities proposed by TRPA will be conducted within Essential Fish Habitat (EFH) designated for Sacramento River winter-run Chinook salmon under the Magnuson-Stevens Fisheries Conservation and Management Act. After reviewing the potential effects of the proposed research project, NMFS SWR PRD believes that the project action, as proposed, will not adversely affect the EFH of Pacific salmon, coastal pelagic species, or west coast groundfish under the Magnuson-Stevens Act.

ISSUANCE CRITERIA

(1) Was the permit applied for in good faith?

NMFS SWR PRD believes that the permit was applied for in good faith.

(2) If granted and exercised, will the permit action NOT operate to the disadvantage of endangered and/or threatened species?

NMFS SWR PRD believes that issuance of the permit will not operate to the disadvantage of endangered and/or threatened species. A successful research program will aid in the recovery of the three ESUs by providing biological information to NMFS.

(3) Will the permit action be consistent with the purposes and policy set forth in section 2 of the ESA?

NMFS SWR PRD believes that issuance of the permit is consistent with the purposes and policy set forth in section 2 of the ESA. The results of this study will contribute to the

development of protection, mitigation and enhancement measures for anadromous fish and their habitat.

(4) **Will the permit action further a bona fide and necessary or desirable scientific purpose or enhance the propagation or survival of the endangered and/or threatened species, taking into account the benefits anticipated to be derived on behalf of the endangered and/or threatened species?**

The NMFS SWR PRD believes that issuance of the permit will further a bona fide and necessary scientific purpose. NMFS SWR PRD finds that: (1) the proposed scientific research is not controversial; (2) the benefits derived from the proposed research are expected to contribute to the knowledge of the species and toward the reduction of human-induced mortalities on fish associated with other activities; and (3) results of the proposed activity will contribute to the cumulative recovery efforts involving ESA-listed anadromous fish populations.

NMFS has a duty to use the best scientific and technical information available to make effective and informed decisions on anadromous fish management issues. An ESA section 10(a)(1)(A) scientific research permit is issued only if NMFS determines that the proposed research activity will result in a net benefit to the ESA-listed species that is the subject of the permit. Potential benefits include enhancing the scientific knowledge base for the species and answering questions or contributing information toward resolving difficult management issues. Also, the information gained during research and monitoring activities will assist managers in making more informed decisions regarding recovery measures. The potential benefits of the TRPA research and monitoring studies are expected to outweigh the potential risks and are expected to assist in the recovery of ESA-listed salmonids.

(5) **Has there been an analysis of the status of the population of each of the ESA-listed species requested to be taken and the effects of the proposed action on the populations, both direct and indirect?**

A consultation under section 7 of the ESA addressing the takes of endangered and threatened species associated with the proposed action have occurred (See "ESA Section 7 Consultation" above). The consultation included an analysis of the status of the ESA-listed anadromous fish ESUs requested to be taken and the potential effects of the proposed action, both direct and indirect, on these ESUs.

(6) **If a live animal is to be taken, transported, and/or held in captivity, does the applicant have the qualifications to conduct activities involving ESA-listed species? Does the applicant have access to adequate facilities for the proper care and maintenance of ESA-listed species?**

The applicant has qualifications and adequate facilities to conduct activities described in the permit application and biological opinion.

(7) Should non-endangered species or population stocks be used instead?

The proposed activities are not specifically designed to gather information on listed species. These species may be taken as part of the proposed activities.

(8) Were the individual ESA-listed species proposed to be taken born in captivity or will they be taken from the wild?

Anadromous salmonids that are both naturally-produced and artificially-propagated stocks occur in the study area. Salmonids of both origins will be subject to take from this project.

(9) Is there adequate provisions in place for the disposition of the ESA-listed species if and when the applicant's project or program terminates?

Any fish killed during the research activities will be reported to NMFS and the fish will be sent to a NMFS-authorized repository.

(10) How do the applicant's needs, program, and facilities compare and relate to proposed and ongoing projects and programs?

Many of the proposed studies have been ongoing for several years and are an integral part of generating information for use by resource managers in the Sacramento-San Joaquin Delta. The newer, short-term studies aim to provide specific information also for use by resource managers.

(11) Do the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application?

NMFS SWR PRD believes that the expertise, facilities, and resources available to TRPA are adequate to successfully accomplish the objectives stated in the application.

(12) Have the opinions or views of scientists or other persons or organizations knowledgeable about the species that is the subject of the application or of other matters germane to the application been considered.

NMFS has considered the opinions and/or views of scientific experts and resource managers with regard to the proposed action.

RECOMMENDATION

The scientific research and enhancement activities proposed by TRPA are consistent with the purposes and policies of the ESA. The NMFS SWR PRD has determined that issuance of Permit 1180 is not likely to jeopardize the continued existence of the ESA-listed species proposed to be taken. Issuance of the permit, as required by the ESA, is based on the finding that the permit: (1) was proposed in good faith, (2) will not operate to the disadvantage of the listed species that are the subject of the permit, and (3) is consistent with the purposes and policies set forth in section 2 of the ESA. For these reasons, NMFS SWR PRD recommends that Permit 1180 be issued to TRPA to be valid until October 30, 2010.

LITERATURE CITED

Busby, P.J., T.C. Wainwright, G.J. Bryant, L. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon and California. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memo NMFS-NWFSC-27. 261 pages.

McEwan, D. 2001. Central Valley steelhead. Contributions to the biology of Central Valley salmonids. California Department of Fish and Game Fish Bulletin 179(1):1-44.

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-66, 598 pp.

APPENDIX 1

Permit No. 1180
151422SWR2003SA8829:SRB

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST REGION
NEPA REVIEW CHECKLIST FOR SALMONID-RELATED PROPOSED RESEARCH & ENHANCEMENT AND INCIDENTAL TAKE PERMITS UNDER SECTION 10 OF THE ENDANGERED SPECIES ACT

DESCRIPTION OF PROPOSED ACTION:

Under the authority of section 10(a)(1)(A) of the ESA, NMFS proposes to issue Scientific Research Permit No. 1180 (Permit 1180) to Thomas R. Payne and Associates (TRPA). The activities proposed in this permit include take of adult and juvenile Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), Central Valley steelhead (*O. mykiss*) and Central California Coast steelhead (*O. mykiss*) associated with a variety of research activities throughout the Central Valley and the Sacramento-San Joaquin Delta (Delta). The permit would be in effect through October 30, 2010, and would be subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit unless it is modified, suspended, or revoked sooner.

In a request for Permit 1180, TRPA proposes to conduct fisheries-related studies in four different stream systems to provide ecological information for various agencies which have projects in the areas. These include long-term monitoring projects and short-term projects to study the trends in abundance and distribution of anadromous and resident fishes (*e.g.*, Sacramento splittail, Chinook salmon). There are four long-term monitoring projects that are projected to continue through 2010, as allowed by this permit. A summary of the study objectives, study location, sampling time and frequency, and sampling gear used for each project is provided in Table 1 of the Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research for Permit 1180. The information gathered on salmonids will be useful in managing for the recovery of listed salmonid populations throughout Central California.

Sampling will occur in four different systems in Northern California ranging from seasonal to year-round sampling, with frequency ranging from daily to monthly (Table 1). The sampling methods include both passive and active capture techniques, with the use of entanglement gears (*e.g.*, nets), entrapment devices (*e.g.*, fyke nets), trawls (*e.g.*, midwater, otter, tow net), and electrofishing. A few of the studies will employ a combination of sampling methods, while most will exclusively use only one method to collect samples (see Table 1).

Determining the appropriateness for use of categorical exclusions for actions proposed under section 10 of the Endangered Species Act:

1. The proposed action involves issuance of a permit for scientific purposes or to enhance the propagation or survival pursuant to section 10(a)(1)(A) of the ESA for hatchery activities.

Yes	No	Uncertain	N/A

2. The proposed action is a *modification* to an existing section 10(a)(1)(A) permit for a *hatchery activity* for which an EA or EIS has *not* already been completed.

Yes	No	Uncertain	N/A

The proposed action is issuance of a research permit for activities that do not involve hatcheries.

3. The proposed action involves issuance of incidental take permits pursuant to section 10(a)(1)(B) of the ESA.

The application is for incidental take in association with research and enhancement, not for activities requiring submission of a Habitat Conservation Plan, as is required under section 10(a)(1)(B).

Yes	No	Uncertain	N/A

4. The proposed action is *not* considered to be a "low effect" habitat conservation plan.

Yes	No	Uncertain	N/A

The proposed action is not related to a habitat conservation plan.

5. Prior NEPA analyses, or equivalent analyses in the form of state environmental assessments, section 7 Endangered Species Act biological assessments or opinions,

and/or scientific reports, describe the environmental effects of the "same" action and demonstrate that the action *will* have significant impacts on the quality of the human environment (considerations in determining whether the proposed action is the "same" as a prior action may include, among other things, the nature of the action, the geographic area of the action, the species affected, the season, the size of the area, etc.)

Yes No Uncertain N/A

The only identified resources of concern associated with this action are listed species of salmon and steelhead. Refer to the Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research for Permit 1180, which analyzes potential impacts of the research projects on listed species. The analyses are based on monitoring reports that show listed species not being adversely affected by the research activities.

6. The proposed action is likely to result in significant impacts as defined in 40 CFR 1508.27.

Yes	No	Uncertain	N/A

Please see following section and refer to response to question 5 above.

Assessing the potential of the proposed action to result in significant impacts, as defined in 40 CFR 1508.27 and NAO 216-6 Section 6.01b.

1. Only potential adverse impacts were considered.

Yes	No	Uncertain	N/A

NMFS also considered the beneficial impacts of issuing Permit 1180, which is expected to provide biological information to aid in the recovery of threatened and endangered species.

2. The proposed action would adversely affect public health or safety.

Yes	No	Uncertain	N/A

All research activities will be conducted by trained personnel and in areas remote from any public features or facilities.

3. The proposed action could affect geographic areas considered to possess unique characteristics, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

Yes	No	Uncertain	N/A

The proposed permitted activities will not result in any ground disturbance or alteration of habitat.

4. The effects of the proposed action on the quality of the human environment are likely to be highly controversial.

Yes	No	Uncertain	N/A

The issuance of Permit 1180 is not controversial. The proposed permitted research activities have been ongoing for several years and the results from the research are used for management of natural resources.

5. The potential effects of the proposed action on the human environment are highly uncertain or involve unique or unknown risks.

Yes	No	Uncertain	N/A

The proposed permitted research activities will use standard sampling protocols and not involve new, untested techniques that may yield unknown risks.

6. The proposed action may establish a precedent for future actions that would have significant adverse effects, or the action represents a decision in principle about a future consideration that could lead to significant adverse effects.

Yes	No	Uncertain	N/A

The proposed permitted research is not a pilot or experimental project.

7. A determination made as to whether the action is related to other actions with individually insignificant but cumulatively significant impacts, taking into consideration that significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment and that significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

Yes	No	Uncertain	N/A

The proposed permitted research activities are purely scientific and are not associated with or intended to contribute towards any past or proposed activities resulting in adverse environmental effects.

8. The proposed action could affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historical resources.

Yes	No	Uncertain	N/A

The proposed permitted research activities will not lead to ground disturbance and are not expected to change the habitat within the action area.

9. The proposed action may adversely affect an endangered or threatened species or its habitat determined to be critical under the Endangered Species Act of 1973.

Yes	No	Uncertain	N/A

NMFS requires that the proposed permitted research minimizes impacts on affected individuals and therefore, the listed species by requiring specific terms and conditions (as described in the research permit and the Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research for Permit 1180). Refer to the Addendum to the Central Valley Programmatic Biological Opinion for Scientific Research for Permit 1180, which concluded the research activities will not jeopardize the continued existence of listed species.

10. The proposed action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Yes	No	Uncertain	N/A

The proposed permitted researchers intend to comply with all Federal, State, tribal and local laws.

11. The proposed action may result in the introduction or spread of a non-indigenous species.

Yes	No	Uncertain	N/A

The proposed permitted research projects do not involve introduction or spread of non-indigenous species.

If YES or UNCERTAIN was checked for any of the above questions, contact the Regional NEPA Coordinator as soon as possible for further guidance.

NEPA REVIEW DETERMINATION:

___ Upon review, NMFS-SWR has determined that this action is likely to result in significant adverse impacts to the quality of the human environment and an environmental impact statement is required to assist in making the best informed decision on an appropriate course of action.

___ Upon review, NMFS-SWR has determined that this action may result in potentially significant adverse effects on the quality of the human environment and that an environmental assessment is required to assist in determining whether an environmental impact statement should be prepared, or there is a finding of no significant impact.

X Upon review, NMFS-SWR has determined that this action will not result in significant adverse effects on the quality of the human environment and may appropriately be excluded from further compliance with the National Environmental Policy Act. Exclusion category [**6.03.e.3(b)** Scientific Research and Enhancement Permits. In general, permits for scientific purposes or to enhance the propagation or survival of listed species issued pursuant to sec. 10(a)(1)(A) of the ESA qualify for a CE (except for permits covered in section 6.03e.2.(c)). The factors listed in section 5.05b. of this Order must be considered in all CE determinations on permits. The RPM must also consider the cumulative impact on the listed species from the total amount of permits issued with CEs, and take into account any population shifts with the subject species.]

PREPARED BY:

Susan Rae Boring
Printed Name/Signature

Fishery Biologist
Title

October 21, 2005
Date